MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

TCP1121 – COMPUTER PROGRAMMING

(All sections / Groups)

14 OCTOBER 2017
2.30 p.m – 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This question paper consists of 6 pages with 4 questions only.

2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Write your answers in the Answer Booklet provided.

Question 1 **[10 Marks]**

a) Pseudocode below is an algorithm to calculate factorial value of a number. Based on the pseudocode, draw a complete flow chart. [3 Marks]

```
1. Start
2. Read n
3. Initialize values i = 1, fact = 1
4. Repeat step 4 to 7 until i = n
5. fact = fact * i
6. Increase i by 1
7. Display fact
8. End
```

b) Identify the output of the following C++ code segments.

i) [1 Mark]

```
int num1 = 6, num2 = 12;
if (num1 <= num2){
    switch (num2 % num1){
        case 0:
            cout << (num2 - 2 * 4);
            break;
        case 1:
            cout << (num1 + num2) / 2;
            break;
        default:
            cout << (num1 % num2);
}
}else{
    cout << (num1 / 4);
}
```

ii) [1 Mark]

```
float x = 5.7, y = 4.2, z = 25.5;
y *= x;
if ((x < y) && !(y < z)){
    cout << "This is true";
}else{
    cout << "Wrong answer";
}
```

iii) [1 Mark]

```
int marks[5] = {49,55,63,21,82};
cout << marks[2] << " " <<  *(marks+1);
```

iv) [1 Mark]

```
int* a = new int;
*a = 2;
int *b = a;
*b *= 2;
cout << *a << " " << *b;
```

Continued...

c) Each of the code segments below has compile error. Identify and correct the errors.

i)
```
char letter = a;
int num = 2;
cout << "The number and letter are " << num <<
    " and " << letter << endl;
```
[1 Mark]

ii)
```
void cal_avg(float m1,float m2){
    return (m1 + m2)/2;
}

int main(){
    float mark1 = 85, mark2 = 96;
    cout << "The average mark is " <<
       cal_avg(mark1, mark2);
    return 0;
}
```
[1 Mark]

iii)
```
char author_name = "Napolean Hill";
int year_born = 1883;
cout << "The author " << author_name <<
    " was born in " << year_born;
```
[1 Mark]

Continued...

Question 2 **[10 Marks]**

a) Can a correct `Month` class definition include both of the following constructors? Explain your answer. [2 Marks]

```
Month( int d = 0, int m = 0, int y = 0 );
Month();
```

b) Write the definition for a class called `Shop`. When an instance of the class is created, a constructor is called to initialize the attribute `name` to "`noname`", attribute `lot` to `0` and attribute `owner` to "`noowner`". Meanwhile, when an instance of the class is destroyed, it displays a message "`Object is destroyed`". The class also consists of a query method that prints the values of all its attributes. [4 Marks]

c) Convert the class definition in Question 2(b) into a Class Diagram. [2 Marks]

d) Study the class definition below.

```
class Final {
    public:
        void announce() {
            cout<< "Start Final";
        }
};
```

i. Rewrite the definition of the class Final to make it an abstract class. [1 Mark]

ii. Write a simple definition for a subclass named `Supp` inherited from class `Final`. Class `Supp` should be a concrete class. [1 Mark]

Continued...

Question 3 [10 Marks]

a) Write a C++ program to accept a character and an integer *n* from user. The program will then displays the next *n* characters. The sample outputs are illustrated as below: [2 Marks]

Sample Output 1

```
Insert one character and integer : d 5
e  f  g  h  i
```

Sample Output 2

```
Insert one character and integer : g 9
h  i  j  k  l  m  n  o  p
```

b) Write a C++ program that takes number of rows and number of columns as input and display a matrix where the element(s) of the matrix is a pairs of (row, column) as sample output below. [3 Marks]

Sample Output

```
Enter number of rows : 4
Enter number of columns : 3

11    12    13
21    22    23
31    32    33
41    42    43
```

c) Write a C++ function `countMax()` that takes two parameters – an array of integers, and a variable indicating the size of the array. It should count the occurrences of the maximum value in the array. For example, if the array contains {10, 40, 15, 40, 15, 40, 20}, the return value is 3 as 40 is the maximum value and it occurs three times in the array.
Note: Write ONLY the function `countMax()`. [4 Marks]

d) Write a C++ for dynamic allocation of a pointer to an array of type character. Then write the code to deallocate the dynamic array. [1 Mark]

Continued...

Question 4

[10 Marks]

a) The following main function and its output are given. Class `Address` has only one private static attribute and one public query method. Write a class definition for the `Address` class with proper attribute initialization. [3 Marks]

```
int main() {
    cout << Address::getPostCode(); // Output = 98000
}
```

b) The C++ program below is incomplete. Complete the code in `int main` function in order to produce the output as below: [2 Marks]

Sample Output

```
Child = 10
Parent = 5
```

```
class Parent {
    int a;
    public:
        void display() {
            a = 5;
            cout << "Parent = " << a << endl;
        }
};

class Child: public Parent {
    int b;
    public:
        void display() {
            b = 10;
            cout << "Child = " << b << endl;
        }
};

int main(){
    Parent *p = new Child ();
    Child c;

    // Write your codes in the answer booklet.

    Return 0;
}
```

Continued...

c) Complete the following code to initialize constant attributes using overloaded constructor through initializer list. [2 Marks]

```
class Exam {
    const int code;
    string subject;
    // Write your codes in the answer booklet.
};
```

d) The program below stores the players' information in a class. User is prompted for the number of players and the names of the players to be recorded using dynamic memory allocation. Complete the C++ program in order to generate the sample output as below. *[Hint: for-loop is needed]* [3 Marks]

Sample Output

```
Number of players : 2
Name of player : Ali
Name of player : Benjamin
```

```
class Player {
    string pname;
    public:
        void setName (string name) { pname = name; }
};


int main() {
    int size;
    Player* players;
    string name;

    // Write your codes in the answer booklet.

    delete [] players;
}
```

End of Paper.